

# Work Order ID 70644



Monday, June 13, 2011 8:06:51 AM

Page 1

Item ID: D212-664-101

Accept



Setup Start



Revision ID:

Item Name: Crosstube Fwd

Stop



Start Date: 6/10/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 6/22/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

*H*

Date: 11-06-13

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D212-664-141

Rev D

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-101

CHG004

CHG005

★ SEE ATTACHED

for BG 11-7-20

110

0.00



Pick Kit  
Packaging

Packaging

Memo

0.00

Packaging

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-141 using CNC bender program 212-fw and Folio D212-664-101

*DP* 11-7-7

*DP* 11-7-7

D212 664 101 B 70644

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
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|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

NOTE: Date & initial all entries

**Work Order ID 70644**

Friday, June 10, 2011 3:53:57 PM



Page 2

Item ID: D212-664-101

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Customer:

Reference:

Run Start



Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Stop



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

*8/22/10**Ⓢ*

140

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube as per Dwg D212-664-141 using drill Jig DT8548 &amp; DT8549, using drill table DT8577, set-up towers in hole #7 as per QSI 10

2-Ream hole to finish size in tube as per Dwg D212-664-141 using drill Jig DT8550 &amp; DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes.

3-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-141

4-Deburr &amp; Inspect for surface damage. Repair damage within limits as per Dwg D212-664-141

*JW*  
*SAD*  
*11-07-13*

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
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|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

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|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

**Work Order ID 70644**

Friday, June 10, 2011 3:53:57 PM



Page 3

Item ID: D212-664-101

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Customer:

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150



HandFXtube

Crosstubes Chemical Conversion

0.00

Memo

0.00

Hand Finishing Crosstubes

Chemical Conversion Coat within 24 hours of bending and drilling

SAP  
JW 11-07-13

160



QC

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

Quality Control

8/10/13

D

170



Outsource2

Outsource process - NDT per QSI038 4.1

0.00

Memo

0.00

Outsource process - NDT

Liquid Penetrant Inspection as per QSI 038  
Issue P/O: 14488  
LPI as per ASTM 1417 Level 2  
Attach copy of NDT results to work order

CL 11/07/13 ①

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
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| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

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|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

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**Work Order ID 70644**

Friday, June 10, 2011 3:53:57 PM



Page 5

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Customer:

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

200

Spray Painting per QSI005 4.2

0.00



SprayPaint

Memo

0.00

SprayPaint

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube as per DEO D212-667-141 with White Imron as per QSI 005 4.2

PRIME:

Start Time: \_\_\_\_\_

Finish Time: \_\_\_\_\_

11-07-15

PAINT:

Start Time: \_\_\_\_\_

Finish Time: \_\_\_\_\_

11-07-18

25 11-07-18

210

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

11 07 19 (1)

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
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|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

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**Work Order ID 70644**

Friday, June 10, 2011 3:53:57 PM

Page 6

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Required Date: 6/22/2011 Req'd Qty: 1.00

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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

Stop

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

220



Crosstubes

Crosstubes

Memo

0.00

0.00

1- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

2- Install supports with magnobond as per OSI 015 Adhere for 12 Hrs

A/R 6398 Magnobond

Batch: 118234

3- Torque bolts as per dwg

PR65EDL \* SEE ATTACHED

11-07-19

PTO

230



QC

Quality Control

QC6- Inspect dimensions to drawing

Memo

0.00

0.00

11 07 20

240



Packaging

Packaging

Pick Kit

Memo

0.00

0.00

11/10/20

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
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|      |      |                    |    |      |     |                                     |                          |

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|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

| W/O: 70644 |      | WORK ORDER CHANGES   |                                |      |     |                                     |                          |
|------------|------|--|--------------------------------|------|-----|-------------------------------------|--------------------------|
| DATE       | STEP | PROCEDURE CHANGE   | By                             | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
| 11.07.14   | 230  | BOND SUPPORTS USING PROSEAL PER ATTACHED<br>PROCEDURE (EMAIL)<br>NOW CHG 005 | See<br>Seq.<br>220<br>22-07-14 |      | 1   | 11.07.14<br>07/42                   | mlm<br>11/07/14          |
|            |      |  |                                |      |     |                                     |                          |

Part No: D212-664 101 PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

NOTE: Date & initial all entries

## Chris Provencal

---

**From:** David Shepherd <dshepherd@dartaero.com>  
**Sent:** Wednesday, June 15, 2011 3:05 PM  
**To:** 'Chris Provencal'  
**Cc:** 'Mike Petsche'; 'Dan Stow'; 'Eric Downing'; 'Linda Lacelle'  
**Subject:** RE: Procedure for installing supports.

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Hi Chris,

I agree with your procedure outlined below. It is our preference to leave the paint on the crosstube if we can for added corrosion protection (and for ease of manufacture). If Dan's final testing shows there is a big difference between a painted/unpainted crosstube, then we will switch to alodine only on the crosstube.

David

---

**From:** Chris Provencal [mailto:cprovencal@dartaero.com]  
**Sent:** Wednesday, June 15, 2011 11:24 AM  
**To:** 'David Shepherd'  
**Cc:** 'Mike Petsche'; 'Dan Stow'; 'Eric Downing'  
**Subject:** RE: Procedure for installing supports.

David,

Can I confirm that this is the agreed procedure for all newly manufactured tubes with off-center supports:

- Scuff paint under support, clean with MEK
- Completely remove any finish on support (if present), scuff bottom surface of support, clean with MEK
- Apply a 0.04" – 0.07" layer of Proseal 890 class B-2 on bottom of support and install wet.
- Install clamps and torque per dwg
- Clean up excess proseal
- Let cure for 72 hours after installation, recheck torque.

Chris

---

**From:** David Shepherd [mailto:dshepherd@dartaero.com]  
**Sent:** Tuesday, June 14, 2011 10:59 AM  
**To:** 'Chris Provencal'  
**Cc:** 'Mike Petsche'; 'Dan Stow'; 'Eric Downing'  
**Subject:** RE: Procedure for installing supports.

Made a couple of small changes.

- Remove finish on xtube in area of support down to alodine finish.
- Touch up alodine on xtube in affected area
- Completely remove any finish on support, scuff bottom surface of support
- Apply a 0.04" – 0.07" layer of Proseal 890 class B-2 on bottom of support and install wet.
- Install clamps and torque per dwg

**Work Order ID 70644**

Friday, June 10, 2011 3:53:57 PM

Page 7

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Reference:

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QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

Stop

| Sequence ID/<br>Work Center ID | Operation<br>Description | Set Up/<br>Run Hours | Tool ID | Tool # | Plan<br>Code | Accept<br>Qty | Reject<br>Qty | Reject<br>Number | Insp.<br>Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

250

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

11 07 2011

260

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-101

REQ

6/17/2011

270

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

6/17/2011

MF 11-720

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
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|      |      |                    |    |      |     |                                     |                          |

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|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

NOTE: Date & initial all entries

# Picklist Print

Friday, June 10, 2011 3:54:04 PM

Page 1

Work Order ID: 70644

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd



Start Date: 6/10/2011

Required Date: 6/22/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:E 04.02.16 Reformat KJ/DS  
 IPP Rev:F 06-03-29 Remove Comments on Pick List JLM  
 IPP Rev:G 07-04-30 As per Rev C JLM IPP Rev:H  
 11.04.26 inspection strip ecn 11-549 EC verified by:DD

| Component Item ID/<br>Item Name  | Replacement<br>Item ID | Mfg/<br>Purch | Bin<br>Item | Primary<br>Location | Last<br>Location | Route<br>Seq ID | Unit of<br>Measure | Qty on<br>Hand | Qty per Kit | Total<br>Qty | Qty<br>Issued | Date<br>Issued | Status |
|--|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
| D212-664-101TRN<br> |                        | Manufactured  | No          |                     |                  | 110             | Each               | 0.0000         | 1           | 1            |               | 11-7-7         |        |
| Crosstube Turning Detail   |                        |               |             |                     |                  |                 |                    |                |             |              |               |                |        |
| D3595-063-450<br>   |                        | Manufactured  | No          |                     |                  | 230             | Each               | 97.0000        | 4           | 4.210526     |               | 11-07-19       |        |
| RUBBER CUSHION   |                        |               |             |                     |                  |                 |                    |                |             |              |               |                |        |

Location Loc Qty Loc Code

LG 97  
 67353 3  
 68893 34  
 70113 60

MS21920-25



Clamp(per MIL-DTL-8783C)

Purchased No

220 Each

52.0000



4

11-07-19

Location Loc Qty Loc Code

LG050 52  
 116264 2  
 117998 50

x4

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
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|      |      |                    |    |      |     |                                     |                          |

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**NOTE:** Date & initial all entries



# Picklist Print

Page 2

Friday, June 10, 2011 3:54:04 PM

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Parent Item Name: Crosstube Fwd

Start Date: 6/10/2011

Required Date: 6/22/2011

Start Qty: 1.00

Required Qty: 1.00

D2893-1  
2.75 Support

Manufactured No

220

Each

21.0000

2 2

70736



BT 11-07-19

| Location | Loc Qty | Loc Code |
|----------|---------|----------|
| LG       | 15      |          |
| 69713    | 15      |          |
| LG052    | 6       |          |
| 68799    | 1       |          |
| 69713    | 5       |          |

Manufactured No

240

Each

16.0000

1

+

h

D3428-1  
Placard

| Location | Loc Qty | Loc Code |
|----------|---------|----------|
| ST053    | 16      |          |
| 68920    | 16      |          |

Purchased No

240

Each

71.0000

4

4

68920

h

AN6-35A  
BOLT

| Location | Loc Qty | Loc Code |
|----------|---------|----------|
| ST343    | 71      |          |
| 116528   | 16      |          |
| 117441   | 30      |          |
| 117872   | 25      |          |

Purchased No

240

Each

57.0000

4

4

117441

h

AN6-36A  
Bolt

| Location | Loc Qty | Loc Code |
|----------|---------|----------|
| ST343    | 57      |          |
| 117441   | 57      |          |

117441

Friday, June 10, 2011 3:54:04 PM

Shop Packet Print

Page 2

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

# Picklist Print

Page 3

Friday, June 10, 2011 3:54:04 PM

Work Order ID: 70644

Parent Item: D212-664-101

Parent Item Name: Crosstube Fwd

Start Date: 6/10/2011

Required Date: 6/22/2011

Start Qty: 1.00

Required Qty: 1.00

MS21042L6

Purchased

No

240

Each

317.0000

6

6

Nut

Location

Loc Qty

Loc Code

ST300

317

117343

117

117677

200

AN960JD616

NAS1149D0663J

Purchased

No

240

Each

0.0000

18

18

Washer

117343

117291

6/17/20

Friday, June 10, 2011 3:54:05 PM

Shop Packet Print

Page 3

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

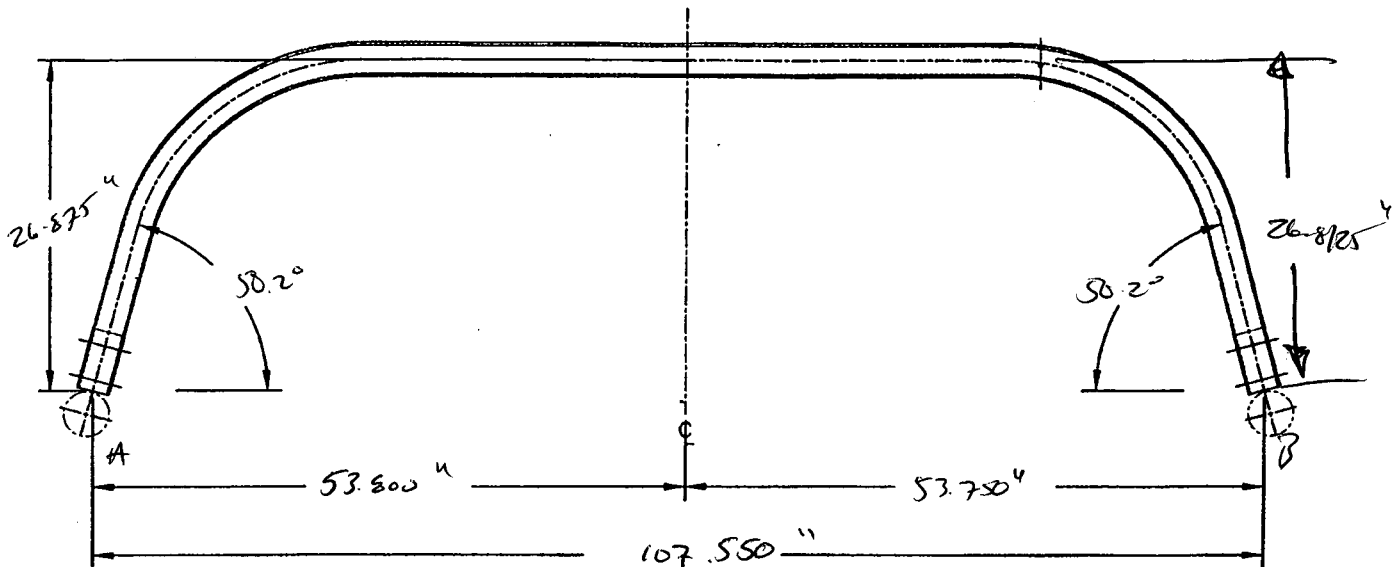
Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

|  |                                  |                    |
|--|----------------------------------|--------------------|
| <b>DART AEROSPACE LTD</b>                            | <b>Work Order:</b> 70644         |                    |
| <b>Description:</b> Crosstube High Fwd (205/212/412) | <b>Part Number:</b> D212-664-101 |                    |
| <b>Inspection Dwg:</b> D212-664-141                  | <b>Rev:</b> D                    | <b>Page 1 of 1</b> |

| Required Dimension | Min    | Max   |
|--------------------|--------|-------|
| Height             | 26.79  | 27.05 |
| 1/2 Span           | 53.59  | 53.85 |
| Angle              | 49     | 52    |
| Total Span         | 107.18 | 107.7 |



| Comments |
|----------|
|          |
|          |
|          |
|          |

|                 |          |
|-----------------|----------|
| QC15 Inspection | ✓        |
| Date            | 11/03/06 |

| Rev | Date     | Change                           | Revised by | Approved |
|-----|----------|----------------------------------|------------|----------|
| A   | 07.02.06 | New Issue                        | KJ/JM      |          |
| B   | 07.05.31 | Dimensions updated per Dwg Rev C | KJ/JM      |          |
| C   | 10.04.01 | Dwg Rev updated                  | KJ         |          |

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

8 7 6 5 4 3 2 1



| Item | Qty<br>-141 | Qty<br>-141B | Part Number    | Description   |
|------|-------------|--------------|----------------|---|
| 1    | X           |              | D212-664-141   | CROSSTUBE ASSEMBLY (205/212/412 HIGH FWD)   |
| 2    |             | X            | D212-664-141B  | CROSSTUBE ASSEMBLY (214 HIGH FWD)   |
| 3    | 1           | 1            | D6005-128      | CROSSTUBE   |
| 4    | 2           | 2            | D2893-1        | SUPPORT   |
| 5    | 4           | 4            | D3595-063-450  | RUBBER CUSHION  |
| 6    | 4           | 4            | MS21920-25     | CLAMP (OR MS21920-26)   |
| 7    | A/R         | A/R          | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023<br>ADHESIVE (TEXTRON/BELL SPEC. 299-947-100,<br>TYPE II, CLASS 2 ADHESIVE) |

**GENERAL NOTES:**

- MATERIAL: MANUFACTURED FROM D6005-128  
FINISHED LENGTH = 126.514±0.020
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF  
USING VIBRATING STYLUS
- WEIGHT: D212-664-141 = 33.6 lbs (PER IIN-D212-664)  
D212-664-141B = 33.6 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 3 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS  
6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF  
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER  
INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1  
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE  
SUPPORT.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE  
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR  
DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND  
MARKS ARE UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT  
HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. *70644*

*PH-06-13*

DEO ATTACHED  
**RELEASED**  
R 2009-10-29  
*MM*

|            |  |  |              |
|------------|--|--|--------------|
| D          | REFORMAT/REVISE GENERAL NOTES/PART LIST;<br>REORGANIZED VIEWS AND REFORMATTED DRAWING<br>TO CURRENT STANDARDS; ADD -141B (ZN B4-2, D4-2);<br>REMOVED REF & ADD TOLERANCES (ZN B4-3, C6-3, C8-3<br>& B6-3); RELOCATED FLAG #6 PER PAR 08-046 (ZN A5-3);<br>MOVED TURNING DETAIL & UPDATED TOLERANCE TO<br>SHEET 4 | RF   | 09.09.30     |
| C          | REMOVE -851 ABRASION STRIP; ADD MAGNOBOND<br>6398, CUSHION, REVERSE CLAMPS   | PH   | 07.03.08     |
| B          | ADD HOLES FOR COMPATABILITY WITH BHT/AA<br>SKIDTUBES   | PH   | 05.02.04     |
| A          | NEW ISSUE  | PH   | 00.12.12     |
| REV.       | DESCRIPTION  | BY   | DATE         |
| DESIGN     | <i>PH</i>  | <b>DART AEROSPACE LTD</b><br>HAWKESBURY, ONTARIO, CANADA   |              |
| DRAWN      | RF   | DRAWING NO.  | REV. D       |
| CHECKED    | <i>97</i>  | D212-664-141   | SHEET 1 OF 4 |
| MFG. APPR. | <i>D</i>   | TITLE  | SCALE        |
| APPROVED   | <i>MD</i>  | XTUBE ASSY (205/212/412 HI FWD)  | NTS          |
| DE APPR.   | <i>#</i>   | COPYRIGHT © 2000 BY DART AEROSPACE LTD<br>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS<br>NOT TO BE USED FOR ANY PURPOSE OR COPIES OR COMMUNICATED TO ANY OTHER PERSON WITHOUT<br>WRITTEN PERMISSION FROM DART AEROSPACE LTD. |              |
| DATE       | 09.09.30   |  |              |

8 7 6 5 4 3 2 1

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

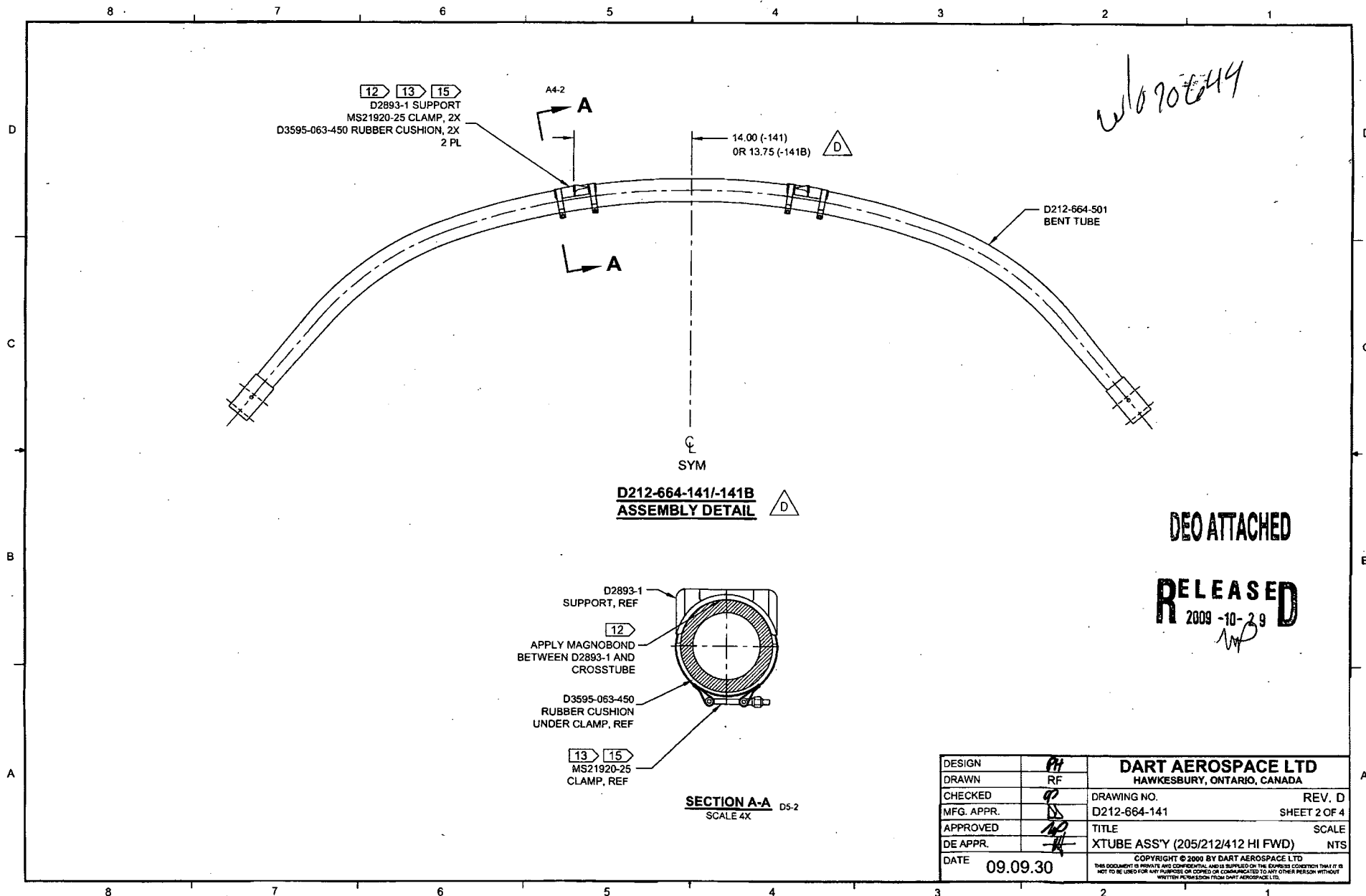
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries





DEO ATTACHED

RELEASED  
2009-10-29

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
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|      |      |                    |    |      |     |                                     |                          |

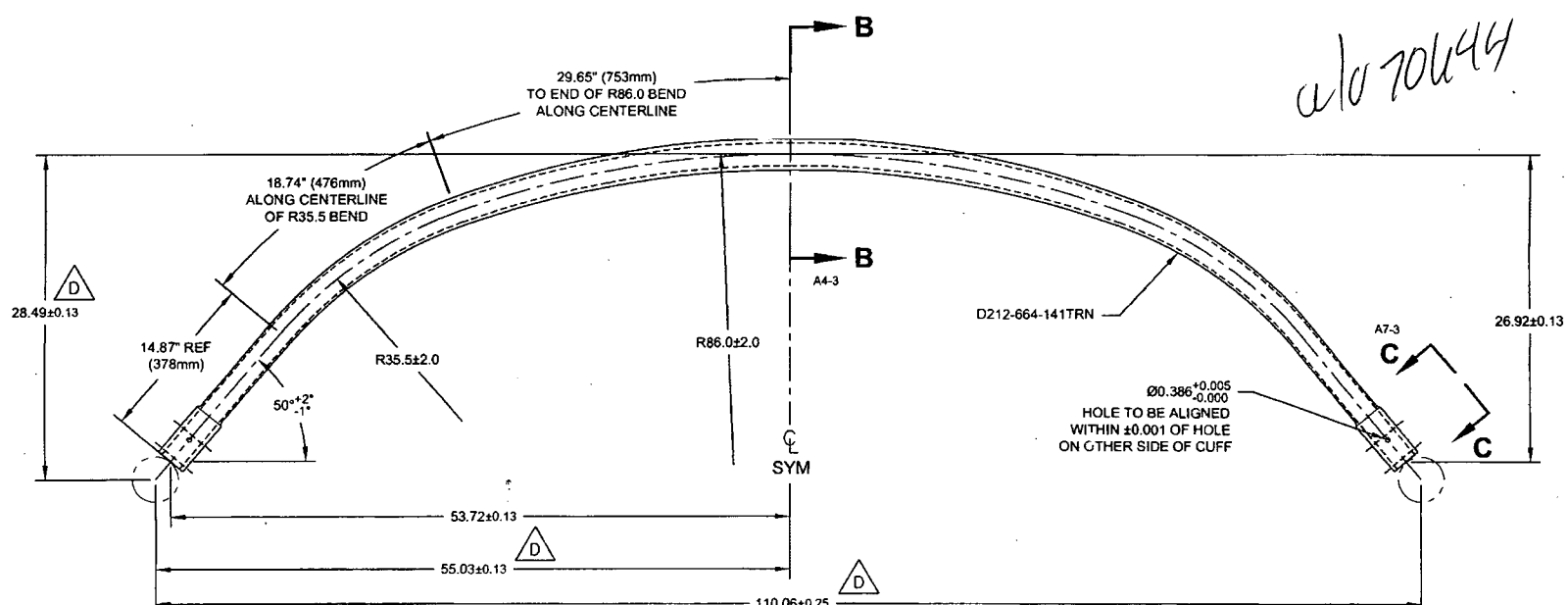
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

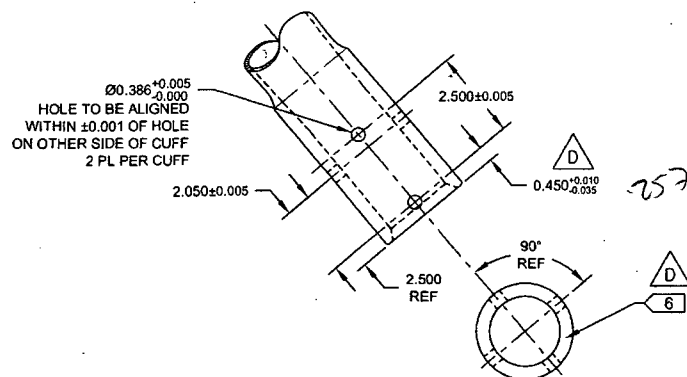
| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
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|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
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**NOTE:** Date & initial all entries

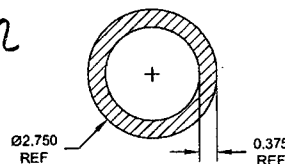
8 7 6 5 4 3 2 1



**D212-664-501**  
**BENDING AND DRILLING DETAIL**



**VIEW C-C: CUFF DETAIL** C2-3  
SCALE 3X



**SECTION B-B** C4-3  
SCALE 4X

DEO ATTACHED

**RELEASED**  
2009-10-29

|  |          |  |              |
|--|----------|--|--------------|
| DESIGN   | PH       | <b>DART AEROSPACE LTD</b>              |              |
| DRAWN  | RF       | HAWKESBURY, ONTARIO, CANADA            |              |
| CHECKED  | QD       | DRAWING NO.                            | REV. D       |
| MFG. APPR.   | DS       | D212-664-141                           | SHEET 3 OF 4 |
| APPROVED   | 102      | TITLE                                  | SCALE        |
| DE APPR.   | 11       | XTUBE ASS'Y (205/212/412 HI FWD)       | NTS          |
| DATE   | 09.09.30 | COPYRIGHT © 2000 BY DART AEROSPACE LTD |              |
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8 7 6 5 4 3 2 1

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

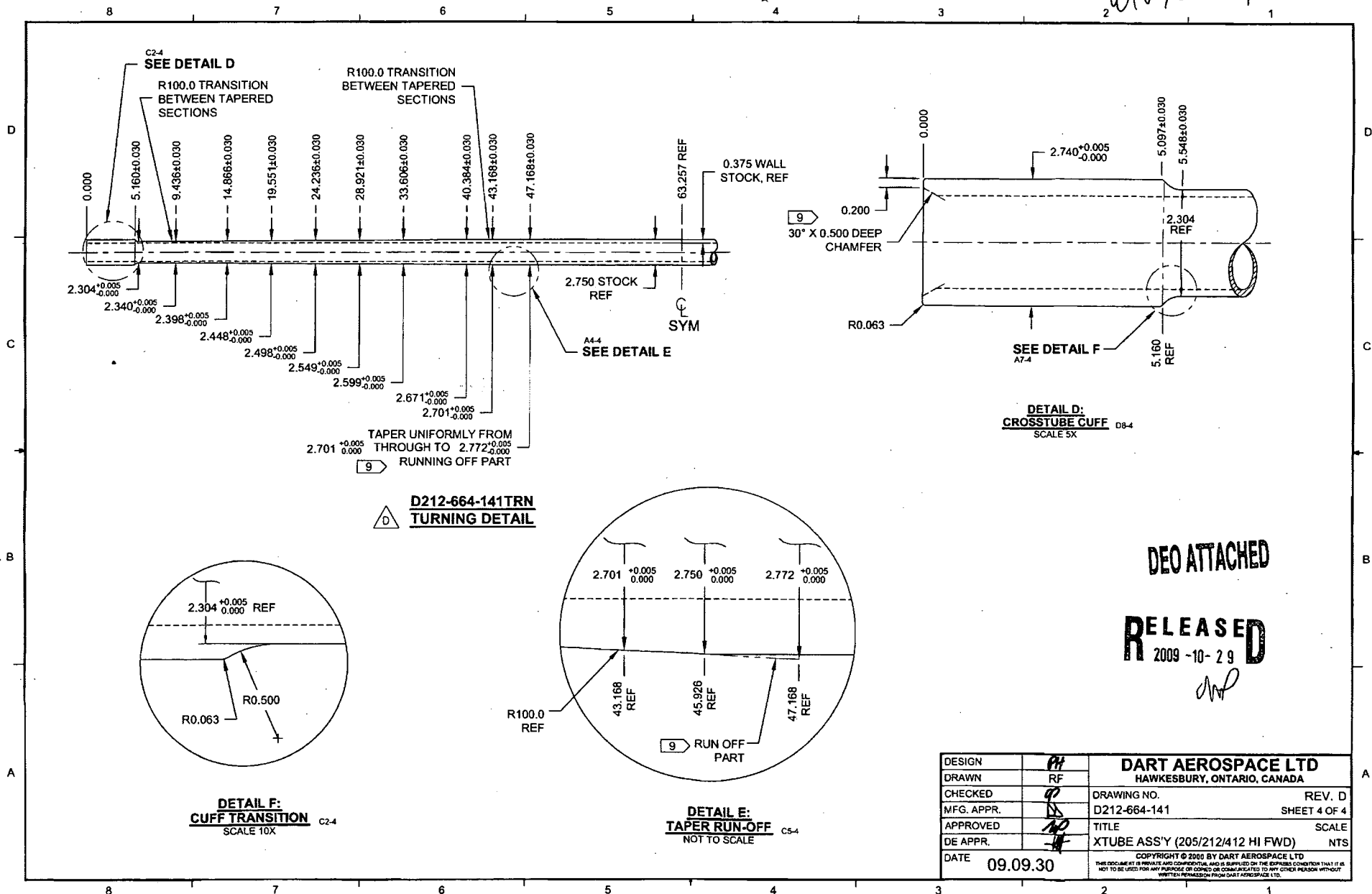
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

u/o 70644



| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

|                             |  |                      |   |  |                                |                           |              |
|-----------------------------|--|----------------------|---|--|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D212-664-141 | TITLE<br>XTUBE ASSY (205/212/412 HI FWD) | REV. D               | DART AEROSPACE LTD<br>ENGINEERING ORDER |  | D.E.O. NO.<br>D212-664-141-D-1 | SHEET NO.<br>SHEET 1 OF 2 | SCALE<br>NTS |
| DRAWN                       | CHECKED <i>UP</i>                        | MFG. APPR. <i>ER</i> | APPROVED <i>MP</i>                      |  | DE APPR. <i>MP</i>             |                           |              |
| DATE 11.04.07               | DATE 11.04.11                            | DATE 11.04.12        | DATE 11/04/12                           |  | DATE 11.04.12                  |                           |              |

**PURPOSE:**

ADD AN INSPECTION WINDOW TO UNDERSIDE OF CROSSTUBE.

**CHANGE:**

NOTES 2 OF SHEET 1 IS AMENDED AS FOLLOWS:

**IS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND  
PAINT OUTSIDE PER DART QSI 005 4.2  
REMOVE MASKING AND APPLY CLEAR COAT

**WAS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2

**RELEASED**  
2011-04-18

*u/070644*

| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

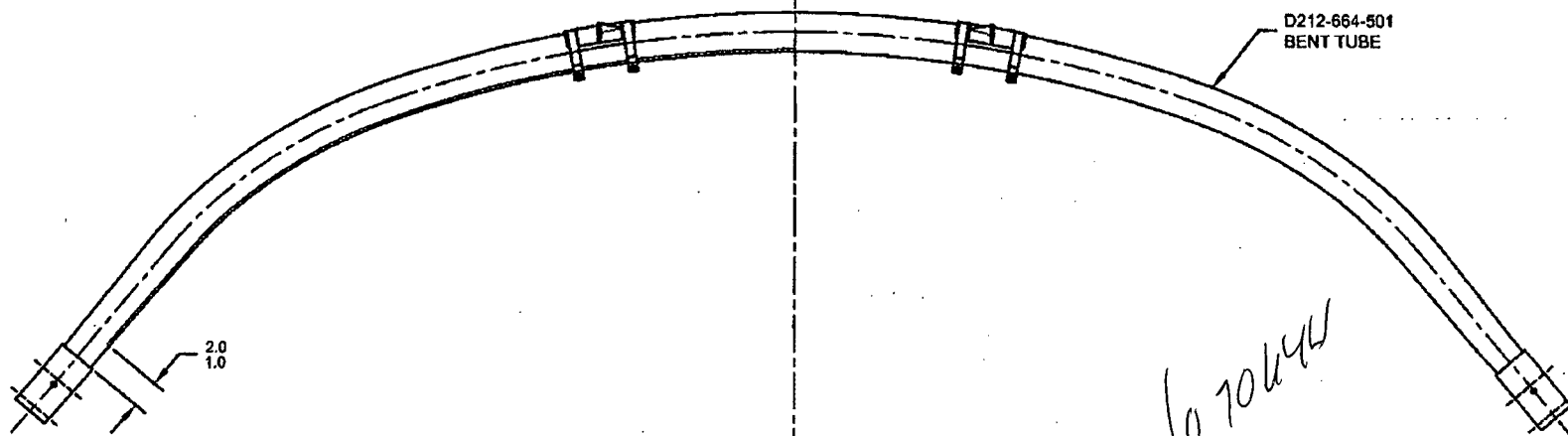
**NOTE:** Date & initial all entries



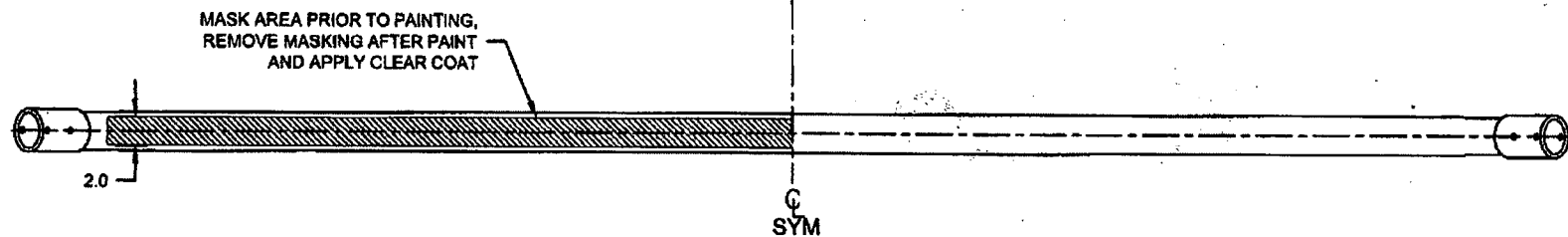
|                             |  |                      |   |                                |                           |              |
|-----------------------------|--|----------------------|---|--------------------------------|---------------------------|--------------|
| DRAWING NO.<br>D212-664-141 | TITLE<br>XTUBE ASSY (205/212/412 HI FWD) | REV. D               | <b>DART AEROSPACE LTD<br/>ENGINEERING ORDER</b> | D.E.O. NO.<br>D212-664-141-D-1 | SHEET NO.<br>SHEET 2 OF 2 | SCALE<br>NTS |
| DRAWN                       | CHECKED <i>CP</i>                        | MFG. APPR. <i>CE</i> | APPROVED <i>WPD</i>                             | DE APPR. <i>WPD</i>            |                           |              |
| DATE 11.04.07               | DATE 11.04.11                            | DATE 11.04.12        | DATE 11/04/12                                   | DATE 11.04.12                  |                           |              |

**IS:**

**WAS:**



**D212-664-141/-141B  
ASSEMBLY DETAIL**



| W/O: |      | WORK ORDER CHANGES |    |      |     |                                     |                          |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE   | By | Date | Qty | Approval<br>Chief Eng /<br>Prod Mgr | Approval<br>QC Inspector |
|      |      |                    |    |      |     |                                     |                          |
|      |      |                    |    |      |     |                                     |                          |

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

| NCR: |      | WORK ORDER NON-CONFORMANCE (NCR) |                             |                                 |                |                           |                       |                          |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC<br>Section A   | Corrective Action Section B |                                 |                | Verification<br>Section C | Approval<br>Chief Eng | Approval<br>QC Inspector |
|      |      |                                  | Initial<br>Chief Eng        | Action Description<br>Chief Eng | Sign &<br>Date |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |
|      |      |                                  |                             |                                 |                |                           |                       |                          |

**NOTE:** Date & initial all entries

## 5.0 PARTS LIST

## 5.1 HIGH GEAR CROSSTUBES

| Item | -101 | -201 | -203 | Part Number      | Description  |
|------|------|------|------|------------------|--|
|      | X    |      |      | D212-664-101     | CROSSTUBE INSTALLATION,<br>204/205/210/212/214/412, UH-1H,<br>UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD |
|      |      | X    |      | D212-664-201     | CROSSTUBE INSTALLATION,<br>204/205/210/212/214, UH-1H,<br>UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT     |
|      |      |      | X    | D412-664-203     | CROSSTUBE INSTALLATION,<br>412 HIGH AFT  |
| 11   | X    |      |      | D212-664-141     | CROSSTUBE ASSEMBLY,<br>204/205/210/212/214/412, UH-1H,<br>UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH FWD     |
| 2    |      | 1    |      | D212-664-241     | CROSSTUBE ASSEMBLY,<br>204/205/210/212/214, UH-1H,<br>UH-1A/B/E/F/L/P, TH-1F/L, HH-1K HIGH AFT         |
| 3    |      |      | 1    | D412-664-243     | CROSSTUBE ASSEMBLY,<br>412 HIGH AFT  |
| 10   | 2    |      |      | * D2893-1        | SUPPORT  |
| 11   | 4    |      |      | * D3595-063-450  | RUBBER CUSHION   |
| 12   | 4    |      |      | * MS21920-25     | CLAMP (OR MS21042-26)  |
| 13   | 4    |      |      | AN6-35A          | BOLT   |
| 14   | 4    |      |      | AN6-36A          | BOLT   |
| 15   | 6    |      |      | MS21042L6        | NUT (OR MS21042-6)   |
| 16   | 18   |      |      | AN960JD616       | WASHER   |
| 20   |      | 2    |      | * D2940-1        | SUPPORT  |
| 21   |      | 4    |      | * D3595-063-530  | RUBBER CUSHION   |
| 22   |      | 4    |      | * MS21920-28     | CLAMP (OR MS21042-30)  |
| 23   |      | 4    |      | AN6-40A          | BOLT   |
| 24   |      | 2    |      | AN6-41A          | BOLT   |
| 25   |      | 6    |      | MS21042L6        | NUT (OR MS21042-6)   |
| 26   |      | 18   |      | AN960JD616       | WASHER   |
| 30   |      |      | 1    | * D2896-1        | SUPPORT  |
| 31   |      |      | 2    | * D2856-600-1009 | ABRASION STRIP   |
| 32   |      |      | 2    | * D3595-063-570  | RUBBER CUSHION   |
| 33   |      |      | 4    | * MS21920-28     | CLAMP  |
| 34   |      |      | 2    | * MS21920-30     | CLAMP (OR MS21042-32)  |
| 35   |      |      | 4    | AN6-40A          | BOLT   |
| 36   |      |      | 2    | AN6-41A          | BOLT   |
| 37   |      |      | 6    | MS21042L6        | NUT (OR MS21042-6)   |
| 38   |      |      | 18   | AN960JD616       | WASHER   |
| 39   |      |      | 2    | * D3189-1        | CHAFING SHIELD   |
| 50   | 1    |      |      | * D3428-1        | PLACARD  |

\*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-141/-241 OR D412-664-243 ASSEMBLIES ABOVE  
NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA  
SKIDTUBES.

**ACUREN****RAPPORT D'INSPECTION PAR RESSUAGE**

P- 12376

PAGE 1 DE 1

CLIENT Dart Aerospace DATE 14-7-2011 HEURE ☒ AM ☒ PM  
 ATTENTION Linda Lacelle N° TRAVAIL 188-11-02320  
 ADRESSE 1270 ABERDEEN N° CLIENT PO/WO 14488  
Hawkesbury, ONT SITE DE TRAVAIL Hawkesbury Plant  
 PROJET FPI ON CROSS TUBES AND ACCEPTATION STD. ASTM 1417 DATE/RÉV. 2005  
 ITEM(S) EXAMINÉ Sleeves

DESCRIPTION DES TRAVAUX N° PROCÉDURE LT-4002 DATE/RÉV. 2008 N° TECHNIQUE LT-4002 DATE/RÉV. 2008

N° ITEMS 1 MATÉRIEL Aluminium ÉPAISSEUR Various  
 DESCRIPTION A wet Fluorescent Liquid penetrant examination was completed 100% external

**DÉTAILS DES INSPECTIONS**

MÉTHODE : ☒ FLUORESCENT ☐ VISIBLE ☒ LAVABLE À L'EAU ☐ MÉTHODE DISSOLVANT ☐ PRÉ-ÉMULSIONNANT  
 MARQUE : MagnaFlux LUM. NOIRE S/N 1878 ☐ PUISS. > 1 000 µ W/cm² ☐ AMBIANT < 2 fc  
 PÉNÉTRANT : 2267 TEMPS PÉNÉTRATION MIN. 10 45 MIN. ÉQUIP. LUMIÈRE ☐ LAMP. POCHÉ ☒ LAMP. CULASSE ☐ PUISS. > 100 fc @ SURFACE  
 DISSOLVANT PÉNÉTRANT H<sub>2</sub>O TEMPS SÉCHAGE MIN. >10 MIN. AUTRES  
 RÉVÉLATEUR SKD 52 TEMPS RÉVÉLATION MIN. 10 MIN. MÈTRE LUM. N/S 00525 DATE CAL DUE 15 oct 2011  
 TYPE RÉVÉLATEUR ☒ NON AQUEUX ☐ AQUEUX ☐ SEC

**SURFACE INSPECTÉE**

CONDITION SURFACE ☐ MEULÉE ☐ SOUDÉE ☒ MACHINÉE ☐ MRENAILLÉE ☐ MÉTAL PROPRE  
 TEMPÉRATURE SURFACE ☐ < -4°C/20°F ☐ -4°C/20°F À 10° C/50°F ☒ 10°C/50°F À 52°C/125°F ☐ > 52°C/125°F

**RÉSULTATS** (☐ MÉTRIQUE ☐ IMPÉRIALE)

| ITEM | COMMENTAIRES           | ACCEPTÉ | REJETÉ |
|------|------------------------|---------|--------|
| 1    | Crosstube - W.O. 70645 | ✓       |        |
| 1    | Crosstube - W.O. 70644 | ✓       |        |
| 1    | Crosstube - W.O. 69360 | ✓       |        |
| 1    | Crosstube - W.O. 69361 | ✓       |        |
| 8    | Sleeve - W.O. 70858    | ✓       |        |
| 1    | Crosstube - W.O. 69105 | ✓       |        |
| 1    | Crosstube - W.O. 68521 | ✓       |        |
| 1    | Crosstube - W.O. 61771 | ✓       |        |
| 1    | Crosstube - W.O. 71035 | ✓       |        |
| 1    | Crosstube - W.O. 71036 | ✓       |        |

**Étendue des Services**

L'entente selon laquelle le Groupe Acuren Inc. exécute les services ne concerne que les énoncés par écrit. En aucune circonstance ces services ne s'étendent au-delà de l'exécution des services demandés. Il est entendu que toutes les descriptions, les observations et les expressions d'opinions faites par Acuren reflètent les opinions ou les observations de l'entreprise fondées sur l'information et les hypothèses fournies par le propriétaire/opérateur, et elles ne constituent pas des déclarations ou des garanties ou ne peuvent être interprétées comme constituant. Le Groupe Acuren Inc. n'assume aucune des responsabilités du propriétaire/opérateur, et le propriétaire/opérateur conserve la responsabilité entière des décisions prises en matière d'ingénierie, de fabrication, de réparation et d'usage à partir de l'information ou des données fournies par Acuren en rapport avec les services décrits dans les présentes ne peuvent excéder le coût des services rendus.

**Norme de Diligence**

Dans l'exécution des services, le Groupe Acuren Inc. applique le degré de diligence, le soin et la compétence normalement exercés dans des circonstances semblables par d'autres fournisseurs de ce type de services opérant dans la même localité ou dans une localité similaire. Aucune autre garantie, implicite ou explicite, n'est faite ou voulue par le Groupe Acuren Inc.

**SIGNATURES**

REPRÉSENTANT Ian Titley FTJ#: 003577  
 TECHNICIEN (SIGNATURE): [Signature] SIGNATURE  
 NOM (MOULÉ): ERIC ANDRIGER 1<sup>er</sup> TECHNICIEN  
 2<sup>nd</sup> TECHNICIEN  
 ONGC NIVEAU II SNT NIVEAU \_\_\_\_\_ ONGC NIVEAU \_\_\_\_\_ SNT NIVEAU \_\_\_\_\_  
 ONGC N° REGISTRATION 10780 ONGC N° REGISTRATION \_\_\_\_\_